Hurricane Lane brought fire and rain to Hawai‘i

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Rainbow Falls, Hilo, on a normal day and during Hurricane Lane. Left photo credit: Ryan McClymont; right photo credit: G Tribble, USGS

Hurricane Lane was an impactful event for the Hawaiian Islands. In August 2018, over a four-day period, Hawai‘i Island received an average of 17 inches of rainfall, with a four-day single-station maximum of 57 inches, making Hurricane Lane the wettest tropical cyclone ever recorded in Hawai‘i. A study published in the *Bulletin of the American Meteorological Society*, led by University of Hawai‘i at Mānoa researchers, details the compounding hazards—fire and rain—produced by the storm.

“In this study, we document what we believe to be the first instance of a hurricane causing both heavy rainfall and contributing to multiple instances of fire simultaneously,” said **Alison Nugent**, lead author of the

study and assistant professor of Atmospheric Sciences in UH Mānoa's School of Ocean and Earth Science and Technology (SOEST).

A team of UH Mānoa and East-West Center scientists analyzed multiple aspects of the storm's meteorology and climatology, the environmental conditions leading up to the storm, and documented the associated societal impacts.

They found that land-use characteristics and preceding moisture conditions exacerbated fire hazards, and both fire and rain severity were influenced by the hurricane environment and local topographic features. Conditions at the edge of the storm resulted in dry windy weather conducive to fire, while closer to the storm center, the incredibly moist atmosphere lifted by Hawai'i's mountains brought intense, long-lasting rainfall. The simultaneous occurrence of rain-driven flooding and landslides, strong winds and multiple fires complicated the emergency response.

Hawai'i's vulnerability

The vulnerability of a population in any given location to the impacts of tropical cyclone hazards is determined by a multitude of interacting factors. Biophysical aspects include distance inland from the coast, terrain slope, coastal ecosystem integrity and land surface cover. Socioeconomic factors include infrastructure quality, the availability of early warning systems, and capacity for evacuation and emergency response.

"The surprising thing about Hurricane Lane was that, despite never making landfall, the storm caused considerable damage and disruptions across the state from two rather contradictory things: fire and rain," said Nugent. "Severe flooding on the windward side of Hawai'i Island built over several days, and multiple fires initiated on the leeward sides of Maui and O'ahu within hours of each other. Hurricane Lane is one of only three documented cases of hurricanes influencing wildland fire risk in real-time."

Ryan Longman with the East-West Center; **Clay Trauernicht**, **Matthew Lucas**, **Henry Diaz** and **Thomas Giambelluca** with UH Mānoa are also co-authors on the study. This work was partially supported through the National Science Foundation EPSCoR project, 'Ike Wai.

For more see SOEST's website.

—By Marcie Grabowski

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